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| 10/593,004 | 09/14/2006 | Tomoyuki Ando | SHIGA7.056APC | 6973 |

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KNOBBE MARTENS OLSON & BEAR LLP
2040 MAIN STREET
FOURTEENTH FLOOR
IRVINE, CA 92614

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| EXAMINER |
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LEE, SIN J

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| ART UNIT | PAPER NUMBER |
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1795

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| NOTIFICATION DATE | DELIVERY MODE |
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08/21/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

jcartee@kmob.com
eOAPilot@kmob.com

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| Office Action Summary | Application No. 10/593,004 | Applicant(s) ANDO, TOMOYUKI | |
| | Examiner Sin J. Lee | Art Unit 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 2 and 3 are canceled by applicants.
2. In view of the certified English translation of the Japanese priority document, previous 103(a) rejection over Hirayama et al (JP'479) is hereby withdrawn.

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 1 and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (US 6,340,734 B1).

Lin teaches a negative photoresist composition containing a silsesquioxane polymer, an acid sensitive crosslinking component and a photoacid generator. Lin also teaches that the polymer component *preferably* is a blend of a silsesquioxane polymer with a non-silsesquioxane polymer. See col.7, lines 59-67, col.8, lines 1-2. Lin teaches that such blend gives improved thermal characteristics, decreased dissolution rate and higher crosslinking efficiency during exposure step (see col.9, lines 47-56, col.10, lines 40-49). Lin furthermore states the following (see col.8, lines 44-60);

In the photoresist compositions containing the blended polymer component, the silsesquioxane polymer in the blend may be selected from the novel silsesquioxane polymers described above or may be selected from other silsesquioxane polymers such as poly(p-hydroxybenzylsilsesquioxane) (PHBS), poly(p-hydroxybenzylsilsesquioxane-co-methoxybenzylsilsesquioxane) (PHB/MBS), poly(p-hydroxybenzylsilsesquioxane-co-t-butylsilsesquioxane) (PHB/BS), poly(p-hydroxybenzylsilsesquioxane-co-cyclohexylsilsesquioxane) (PHB/CHS), poly(p-hydroxybenzylsilsesquioxane-co-phenylsilsesquioxane) (PHB/PS), and poly(p-hydroxybenzylsilsesquioxane-co-bicycloheptylsilsesquioxane) (PHB/BHS). If desired, a combination of different silsesquioxane polymers may be used in the blend with the non-silsesquioxane polymer.

Specifically, in Example 9, Lin teaches a negative photoresist composition containing (i) a blend of poly(4-hydroxybenzylsilsesquioxane-co-4-methoxybenzylsilsesquioxane) 3:2 (PHB/MBS 3:2) and poly(4-hydroxystyrene) (PHS), (ii) tetramethoxymethyl glycoluril (present glycoluril-based crosslinking agent) and (iii) di(t-butylphenyl)iodonium camphorsulfonate. In the paragraph shown above (col.8, lines 44-60), Lin lists (PHB/MBS) (which he uses in Example 9) *as well as* (PHB/PS), which is poly(p-hydroxybenzylsilsesquioxane-co-phenylsilsesquioxane), as examples of suitable silsesquioxane polymers that can be used in his negative resist composition that employs the blend of a silsesquioxane polymer and a non-silsesquioxane polymer. Since Lin lists both PHB/MBS and PHB/PS as suitable silsesquioxane polymers that can be used in the blend, it would have been obvious to one skilled in the art to replace the PHB/MBS 3:2 used in Lin's Example 9 with PHB/PS 3:2 as the silsesquioxane polymer component for the blend with a reasonable expectation of obtaining improved thermal characteristics, decreased dissolution rate and higher crosslinking efficiency

Art Unit: 1795

during exposure step. The PHB/PS 3:2, which is poly(p-hydroxybenzylsilsesquioxane-co-phenylsilsesquioxane (60%:40%)), teaches present silsesquioxane resin having the repeat unit (I) and repeat unit (II). Lin also teaches that his silsesquioxane polymers preferably have Mw of 1,500 to 10,000 (see col.6, lines 5-10).

In Example 9, Lin uses di(t-butylphenyl)iodonium camphorsulfonate as his photoacid generator. However, Lin also teaches di(t-butylphenyl)iodonium perfluorooctanesulfonate as the other example of onium salt that can be used in his composition as his photoacid generator (see Example 10 and col.11, lines 53-59). Thus, it would have been obvious to one skilled in the art to replace the di(t-butylphenyl)iodonium camphorsulfonate with di(t-butylphenyl)iodonium perfluorooctanesulfonate in Lin's Example 9 with a reasonable expectation of success. Thus, Lin's teaching renders obvious present combination of an onium salt containing a fluorinated alkylsulfonic acid ion as an anion and a glycoluril-based crosslinking agent. Therefore, Lin's teaching renders obvious present inventions of claims 1 and 4.

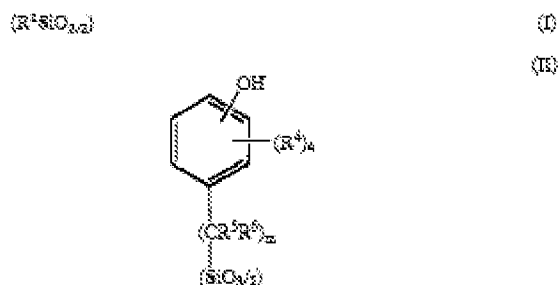
Lin teaches (col.12, lines 13-16) that his photoresist composition can also include an organic base additives. Thus, Lin's teaching renders obvious present invention of claim 5. Lin also teaches that his photoresist composition is especially useful as imaging layers in multilayer photolithographic processes (see col.12, lines 48-50 and col.13, lines 7-35 (see also Example 6)) and that his composition can be patterned using electron beam (see col.12, lines 52-56). Thus, Lin's teaching renders obvious present inventions of claims 6 and 9. Also, since Lin teaches present negative resist

Art Unit: 1795

composition of claim 1, it is the Examiner's position that Lin's negative resist composition as discussed above would inherently be capable of being used in a magnetic film pattern forming method as recited in present claims 7 and 8.

5. Claims 1 and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gronbeck et al (US 2003/0099899 A1) (with Crivello (4,603,101) which is incorporated by reference by Gronbeck and which is being cited here for teaching di(t-butylphenyl)iodonium trifluoromethanesulfonate)).

Gronbeck teaches (see claims 25-32) a negative-acting photoimageable composition comprising a binder polymer, a photoacid generator and a cross-linking agent, wherein the binder polymer comprises the following monomer units of formulas (I) and (II):



wherein R^1 is selected from (C_1-C_{12}) alkyl, substituted (C_1-C_{12}) alkyl, (C_2-C_6) alkenyl, substituted (C_2-C_6) alkenyl, phenyl, $C_6(R^7)_2$, (C_2-C_2) alkyl($C_6(R^7)_4$), (C_2-C_2) alkyl(C_2H_4OZ), vinyl and substituted vinyl; Z is selected from (C_2-C_6) alkylsulfonate ester or arylsulfonate ester; each R^7 is independently selected from H, F, (C_1-C_6) alkyl, (C_1-C_6) alkoxy, halo(C_1-C_6)alkyl, hydroxy-halo(C_1-C_6)alkyl or halo(C_1-C_6)alkoxy; each R^2 is independently selected from R^7 and OH; each R^3 is independently selected from H or F; each R^4 is independently selected from H, F, CH_3 , CF_3 , CHF_2 , and CH_2F ; and $m=0-2$.

Specifically, in Example 27, Gronbeck teaches a copolymer having 5% phenylsilsesquioxane and 95% hydroxybenzylsilsesquioxane. In claim 31 and 32, Gronbeck teaches melamine based crosslinking agent as well as glycoluril based crosslinking agent. Gronbeck teaches ([0079]) that suitable photoacid generators for his composition include halogenated triazines, onium salts, sulfonated esters and halogenated sulfonyoxy dicarboximides, and for the examples of suitable onium salts, Gronbeck refers(see [0082]) to U.S. Pat. No 4,603,101, which is incorporated by reference by Gronbeck and which teaches di(t-butylphenyl)iodonium trifluoromethanesulfonate in its working Example 4. Based on these teachings, it would have been obvious to one skilled in the art to use di(t-butylphenyl)iodonium trifluoromethanesulfonate as Gronbeck's photoacid generator with a reasonable expectation of obtaining a *bilayer resist system* having improved lithographic performance. Gronbeck teaches ([0075]) that his polymers have Mw of 1,000 to 100,000. This range overlaps with present range of claim 4 and thus renders present range prima facie obvious. In the case "where the [claimed] ranges overlap or lie inside ranges disclosed by the prior art," a prima facie case of obviousness would exist which may be overcome by a showing of unexpected results, In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Gronbeck also teaches the use of a base additive (see [0101]). Gronbeck teaches ([0107]) that his composition may be used with e-beam. Thus, Gronbeck's teaching renders obvious present inventions of claims 1, 4-6 and 9. Also, since Gronbeck teaches present negative resist composition of claim 1, it is the Examiner's position that Gronbeck's negative resist composition as discussed above

would inherently be capable of being used in a magnetic film pattern forming method as recited in present claims 7 and 8.

Response to Arguments

6. Applicants argue unexpected superior results of present invention over that of Lin by pointing to comparison of present Examples 15 and 16 and Comparative example 1. However, such comparison was not persuasive in showing unexpected superior results of present invention over that of Lin. First, the comparison made was not commensurate in scope with the broadest claim because present claim 1 does not claim the nitrogen containing organic compound or the organic carboxylic acid, both of which are being used in the examples. See MPEP 716.02(d). Also, the comparison was not made to the closest prior art. See MPEP 716.02(e).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

Art Unit: 1795

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sin J. Lee/

Primary Examiner, Art Unit 1795

August 14, 2009